

APPENDIX VI

ANSWERS

NOTE: This appendix provides answers to the review questions found at the end of each chapter of this TRAMAN. When a question was drawn from a source other than this TRAMAN, the reference source is included with the answer.

Chapter 1

- A1. Footing abutment, pile abutment, and concrete abutment.*
- A2. The numbers of rows of piles. A bent has one row of piles; a pier has two or more rows.*
- A3. Foundation bed, footing, and foundation wall.*
- A4. A sheet pile.*
- A5. A mole.*
- A6. The W12 x 50 wide flange shape. Because it has a greater cross-sectional area.*
- A7. The type of construction that uses masonry walls to support floor and roof loads.*
- A8. According to Steelworker 3 & 2, NAVEDTRA 10653-G, page 12-10, girts are used primarily as attachment members for the metal siding.*

Chapter 2

- A1. The transmission system and the distribution system.*
- A2. The radial distribution system.*
- A3. To step down primary voltage to utilization level.*
- A4. On a crossarm or spool rack located below the primary mains.*
- A5. When they are shown to be more economical or when special circumstances warrant the use of concrete poles.*
- A6. Number size, type, voltage, and location.*
- A7. The level of underground water that has collected over an impervious stratum.*
- A8. Water quantity, reliability, and quality.*
- A9. NEVER. Water distribution and sewage collection piping must always be separated.*
- A10. To pump sewage from a lower level to a higher level because gravity flow is no longer possible or practical at the lower level.*

Chapter 3

- A1. (A) Traveled way, (B) shoulder, (C) crown, (D) base course, (E) subbase course, (F) surface or surface course.*

- A2. *Superelevation.*
- A3. *Final cross sections.*

Chapter 4

- A1. *(A) Architectural, (B) civil (C) mechanical, (D) structural.*
- A2. *D.*
- A3. *The roles of the condenser and evaporators can be reversed so that the heat pump can be used for both heating and cooling.*
- A4. *Temperature, humidity, and air motion. (Source: Utilitiesman 3, NAVEDTRA 12532, page 10-41.)*
- A5. *Policy and Procedures for Project Drawing and Specification Preparation, MIL-HDBK-1006/1.*
- A6. *Centimeter. (Source: MIL-HDBK-1006/1.)*
- A7. *Vertical.*
- A8. *The letter P. (Source: MIL-HDBK-1006/1.)*
- A9. *Never.*
- A10. *To make sure the drawing can be clearly reproduced.*

Chapter 5

- A1. *NAFACENGCOM guide specifications.*
- A2. *Specifications take precedence over drawings.*
- A3. *16.*
- A4. *Division 2: Site Work*
- A5. *Part 3: Execution.*
- A6. *Seabee Planner's and Estimator Handbook, NAVFAC P-405.*
- A7. *94 cubic meters.*
- A8. *5 percent. (Source: Seabee Planner's and Estimator's Handbook, NAFAC P-405, appendix C.)*
- A9. *Facilities Planning Guide, NATFAC P-437.*
- A10. *Volume II, Part 3 (Assemblies).*

Chapter 6

- A1. *The vertical axis.*
- A2. *Three times.*
- A3. *To make the line of sight parallel to the horizontal axis of the instrument so that the line of sight will generate a true horizontal plane when the instrument is rotated about the vertical axis.*
- A4. *To enable you to use any point on the vertical cross hair when you are measuring angles or running lines.*
- A5. *Only when a low degree of accuracy can be tolerated and an adjustment cannot be made immediately.*

Chapter 7

- A1. *Barometric leveling and trigonometric leveling.*
- A2. (A) 398.303 meters, (B) -46.506 meters. (If your answer to Part A is incorrect, then you should review Engineering Aid 3, pages 12-18 and AIII-13.)
- A3. (A) 0.08 feet, (B) no.
- A4. (A) -0.21 feet, (B) +23.02 feet.
- A5. 0 feet.
- A6. 1/959 (or 1/1,000).
- A7. N47°45'E.
- A8. 8,520 square feet.

Chapter 8

- A1. *Topographic control is the establishment of the horizontal and vertical control points from which the location and elevation of all topographic details are determined.*
- A2. 0.05 distance in miles. No.
- A3. (A) 243 feet, (B) +28.1 feet, (C) 202.4 feet.
- A4. (A) 566 feet, (B) 327.3 feet.
- A5. *The vertical distance between adjacent contour lines.*
- A6. *Either a summit or a depression.*

Chapter 9

- A1. *Wingnut B. (Source: Engineering Aid 3, NAVEDTRA 10696.)*
- A2. *Inside the triangle of error.*
- A3. *Progression or plane-table traverse.*
- A4. *Correct H-Dist = 365; Product = + 7.3; DE = +0.6; Elev = 117.3.*
- A5. *For any given area distortion is nearly the same in all directions.*
- A6. 3MTV.
- A7. 1,174 miles.

Chapter 10

- A1. *Reconnaissance, preliminary, and final-location survey phases.*
- A2. *To make installation, inspection, and maintenance of the line easier and to lessen the requirement for tree trimming.*
- A3. *The water remaining after absorption, evaporation, and transpiration.*
- A4. 95.92 feet.
- A5. (A) 233.3 square feet, (B) 480.7 cubic yards.
- A6. *A distance at which the cost of haul equals the cost of excavation.*

A7. (C) *The degree of accuracy required.*

A8. *25 feet.*

A9. *0.27974.*

A10. *Interior angles.*

Chapter 11

A1. *Station at PC₁: 19 + 11.71*

Station at PI₁: 23 + 84.28

Station at PCC: 27 + 68.85

Station at PI₂: 29 + 66.62

Station at PT₂: 31 + 43.85

A2. $d_1 = 1052.1'$, $d_2 = 2^\circ 37.9'$, $d = 6^\circ$, $C_1 = 31.13\text{ft}$, $C_2 = 43.84\text{ft}$, $C = 99.81\text{ft}$.

A3. *6 stations (600 feet).*

A4. (A) *124.80 feet, (B) 128.00 feet, (C) 128.80 feet, (D) 128.25 feet, (E) Station 14 + 67, elevation on tune equals 129.0 feet.*

A5. (A) *652.00 feet, (B) 624.00 feet, (C) 636.67 feet, (D) 643.20 feet, (E) Station 11 + 00, elevation = 652.00 feet. (The turning point is the high or low point on a vertical curve. When the tangent grades are equal, the high or low point will be at the center of the tune. When the tangent grades are both plus, the low point is at the PVC and the high point is at the PVT. When both tangent grades are negative, the high point is at the PVC and the low point is at the PVT. When unequal plus and minus tangent grades are encountered, the high or low point will fall on the side of the curve that has the flatter gradient.)*

Chapter 12

A1. *Electromagnetic EDMs and electro-optical EDMs.*

A2. *729.35 meters.*

A3. *Electronic positioning systems.*

A4. *The lock mode.*

Chapter 13

A1. *To determine the moisture content at which the maximum density for a given compactive effort occurs.*

A2. (A) *Proctor, (B) 25.*

A3. *To ensure that densities obtained in the field conform to the project specification requirements.*

A4. *The bulk density can change due to varying temperature and humidity conditions.*

A5. *Shear.*

A6. *Type V (sulphate-resistant portland cement).*

A7. *The aggregate contains excessive organic material.*

- A8. *Hairline cracking.*
- A9. *Water that is in excess of the amount needed for a saturated, surface-dry condition.*
- A10. *For improved watertightness and increased resistance to frost action.*
- A11. *The chemical reaction between cement and water that causes a concrete to harden.*
- A12. *When the test specimen breaks outside the middle third of span length by less than 5 percent.*
- A13. *By heating, dissolution, and emulsification.*
- A14. *The volubility test.*
- A15. *A distillation test.*

Chapter 14

- A1. *75 man-days.*
- A2. *Indirect labor.*
- A3. *61 percent. (Source: NMCB Operations Officer's Handbook, COMSECOND/COMTHIRDNCBINST 5200.2A, Section IV.)*
- A4. *150 man-days. (Source: NMCB Operations Officer's Handbook, COMSECOND/THIRDNCBINST 5200.2A, appendix I.)*
- A5. *Commander, THIRD Naval Construction Brigade.*
- A6. *So that you can (1) get all of the information needed for the job from the person requesting it and (2) pass this information on to the person to whom you are assigning the job.*

Chapter 15

- A1. *24.*
- A2. *0600.*
- A3. *The angular distance of a celestial body measured north or south of the celestial equator along the hour circle of the body.*
- A4. *Over the south celestial pole.*
- A5. *N43°03'.*
- A6. *S76°55'00.1"E.*
- A7. *The calculation of the length of the sides can be cross-checked using different routes.*
- A8. *A primary triangulation station is used as an instrument station and a sighted station. A secondary station is used only for sighting.*
- A9. *38°22'18.25".*

Chapter 16

- A1. *4.*
- A2. *True.*

A3. 4.

A4. (A) 21.18 percent, (B) 74.25 percent, (C) 4.57 percent, (D) SP.

A5. (A) $LL = 43$, (B) $PI = 18$, (C) CL.

A6. 4.

Chapter 17

A1. (A) 1 1/2 inches, (B) 33.0 gallons, (C) 860 pounds, (D) 1,848 sacks,
(E) 333.9 tons.

Chapter 18

A1. Lime.

A2. Clayey soils.

A3. Sieve analysis, Atterberg limits test, moisture-density test, and freeze-thaw test.

A4. A CBR mold. (Source: NAVFAC MO-330, chapter 5.)